

NORTON SOUND SHAKTOOLIK AND UNALAKLEET  
SUBDISTRICTS CHINOOK SALMON STOCK STATUS AND  
ACTION PLAN



A Report to the Alaska Board of Fisheries

By:

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## TABLE OF CONTENTS

|  |     |
|--|-----|
| LIST OF TABLES .....   | iii |
| LIST OF FIGURES .....  | iii |
| Executive Summary .....  | 1   |
| Synopsis .....   | 1   |
| Stock Assessment Background .....  | 1   |
| Fishery Management Background .....  | 2   |
| Commercial and Subsistence Fisheries .....   | 2   |
| Sport Fisheries .....  | 2   |
| Stock Of Concern Recommendation .....  | 3   |
| Outlook .....  | 3   |
| Alaska Board of Fisheries Action .....   | 3   |
| Escapement Goal Evaluation .....   | 3   |
| List of Current Goals and Proposed SEG for Subdistricts 5 and 6 Chinook Salmon Stocks .....                                | 4   |
| Management Action Plan options for Addressing Stocks of Concern as Outlined in the Sustainable Fisheries Policy .....      | 4   |
| Norton Sound Subdistrict 5 and 6 Chinook Salmon Management Plan Review/Development .....                                   | 4   |
| Current Stock Status .....   | 4   |
| C&T Use Finding and the Amount Necessary .....   | 4   |
| Habitat Factors Adversely Affecting the Stock .....  | 5   |
| Do New or Expanding fisheries on this Stock Exist .....  | 5   |
| Existing Management Plan .....   | 5   |
| Action Plan Development .....  | 5   |
| Norton Sound Subdistrict 5 and 6 Chinook Salmon Action Plan Goal .....   | 5   |
| Action Plan Alternatives .....   | 5   |
| Action 1 .....   | 5   |
| Action 2 .....   | 7   |
| Board of Fisheries Regulatory Proposals Addressing Norton Sound Subdistricts 5 and 6 Chinook Salmon Stock of Concern ..... | 7   |
| Research Plan .....  | 7   |
| Norton Sound Initiative and AYK Sustainable Salmon Initiative .....  | 7   |
| Research Projects .....  | 8   |
| Literature Cited .....   | 9   |

## LIST OF TABLES

| Table  | Page |
|--|------|
| 1. Commercial, subsistence and sport chinook salmon harvests for Subdistricts 5 and 6, 1961-2003 ..... | 10   |
| 2. Subdistricts 5 and 6 Management Actions.....  | 11   |
| 3. North River Tower Chinook Salmon count expanded to the Unalakleet Drainage, .....                   | 12   |
| 4. Exploitation of Unalakleet River drainage chinook salmon stocks .....                               | 12   |

## LIST OF FIGURES

| Figure  | Page |
|---|------|
| 1. Norton Sound Commercial Salmon Fishing Districts and Subdistricts .....                | 13   |
| 2. Map of Salmon Rivers in Norton Sound.....  | 14   |
| 3. Unalakleet Test Net Chinook Salmon Catch .....   | 15   |
| 4. North River Chinook Salmon Escapement.....   | 15   |
| 5. Subdistricts 5 (Shaktoolik) and 6 (Unalakleet) Commercial Chinook Salmon Harvest ..... | 16   |
| 6. Subdistricts 5 (Shaktoolik) and 6 (Unalakleet) Combined Chinook Salmon Harvest .....   | 16   |
| 7. Subdistricts 5 (Shaktoolik) Chinook Salmon Harvest.....                                | 17   |
| 8. Subdistricts 6 (Unalakleet) Chinook Salmon Harvest .....                               | 17   |

## EXECUTIVE SUMMARY

### *Synopsis*

In response to the guidelines established in the Sustainable Salmon Fisheries Policy (SSFP) 5 AAC 39.222, the department recommended designating the Norton Sound Subdistrict 5 (Shaktoolik) and Subdistrict 6 (Unalakleet) chinook salmon stock as a yield concern at the October 2003 Board work session. Since 1998, escapement goals have usually been met, but harvests have been severely restricted to do so. These restrictions resulted in an average commercial harvest of 695 fish per year for the five-year period (1999-2003), which is 90% below the previous 10-year harvest (1989-1998) of 7,131 (Table 1). Subsistence harvests during the period 1999-2002 declined 42% compared to the 1994-1998 period. In 2003, there was no commercial harvest of chinook salmon and the subsistence harvest is anticipated to be below average because of inseason restrictions. Therefore, during the past five years there has been a chronic inability to maintain near average yields despite specific management actions taken annually.

### *Stock Assessment Background*

The Norton Sound District is composed of six commercial fishing subdistricts (Figure 1). Most subdistricts have several rivers where subsistence fishing occurs and except for the Nome Subdistrict there are few restrictions (Figure 2).

The salmon harvests for subsistence uses in Norton Sound have gradually increased since statehood, but have remained stable the last decade. Commercial harvests have decreased for salmon in many subdistricts the last few years, but escapements have not increased in response to less fishing pressure. Throughout Norton Sound a number of salmon runs have been lower in recent years. Most of the decreasing harvests were due to weak runs, low prices resulting in less fishing effort, and in some subdistricts the lack of a market.

There are two escapement projects in Subdistrict 6 (Unalakleet). The department operates a test net several miles upstream from the mouth of the Unalakleet River and the Native Village of Unalakleet operates a counting tower further upstream on the North River tributary. Unalakleet River test net indices for chinook salmon have declined over the period 1999-2003 (Figure 3). The North River tower escapement goal has been met four of the five years from 1999-2003 (Figure 4). Following 2000 when the goal was not met, more restrictions have been placed on chinook salmon fishing in order to meet escapement.

Commercial chinook salmon harvests for the two subdistricts combined (Table 1, Figure 5) averaged 7,131 per year for the period 1989-1998. This average declined substantially to 695 fish for the last five years (1999-2003) as chinook runs became weaker (Figures 6, 7 and 8). Subsistence harvest data were not collected in both subdistricts from 1986 through 1993. Subsistence harvests declined from an average of 6,329 for the period 1994-1998 to an average of 3,643 for the four-year period 1999-2002, a 42% decrease (Table 1). A four-year period is used because subsistence harvest is not yet available for 2003.

## *Fishery Management Background*

### **Commercial and Subsistence Fisheries**

Subdistrict 5 (Shaktoolik) and Subdistrict 6 (Unalakleet) have been managed as one fishery because past studies have shown salmon bound for these Subdistricts (Figure 1) intermingle and that harvests in one subdistrict most likely affect the other. The Unalakleet River test net and the North River Tower in Subdistrict 6 are used by the department to assess chinook escapement. North River tower has proven to be a good indicator of chinook salmon abundance in relation to the Unalakleet River (Wuttig, 1999).

The strategy used by the department to open the commercial chinook salmon fishery in Subdistricts 5 and 6 is to wait until increasing subsistence catches have been observed for at least 7 days at the mouth of the Unalakleet River. Typically, chinook salmon commercial fishing periods have been scheduled twice weekly and of 24 hours in duration. This strategy is followed to prevent fishing on milling chinook salmon, migrating Yukon River stocks and to allow for adequate escapement. The only subsistence fishing schedule is for the Unalakleet River which is closed for 36 hours per week from June 1 to July 15 because there is more fishing pressure due to a larger population in Unalakleet than Shaktoolik. The Shaktoolik River is open seven days per week to subsistence fishing and escapements are thought to track well with the Unalakleet River drainage. Aerial surveys are attempted on the Shaktoolik River when conditions are favorable.

In 2000 and 2001, the chinook salmon commercial fishery was closed after two periods because of weak runs. In 2002 and 2003, there were no commercial chinook fisheries because of weak runs. Subsistence fishing for chinook salmon was also closed for three weeks in the Shaktoolik and Unalakleet River drainages during 2003 (Table 2).

### **Sport Fisheries**

Sport fisheries have been active on the Unalakleet River for many years. The U. S. Air Force operated a recreational fishing camp on the river in the early 1960s, and a commercial sport fishing lodge was constructed on the river in the late 1960s by the Breedlove family. The lodge is still in operation but has changed hands and expanded. Between 1983 and 2001 estimated sport fishing effort has ranged from 1,701 angler days in 1989 to 6,257 in 2000 with an average of 3,772 angler days. In 2002, estimated effort increased to 8,195 angler days. The estimated chinook harvests have ranged from 39 fish in 1983 to 850 fish during 1986 (Table 1). The 10-year (1989-1998) average harvest was 350 chinook salmon, and the recent 4-year (1999-2002) average harvest was 389 chinook salmon. In 2002, the estimated harvest was 544 chinook salmon. The estimated exploitation of chinook in the Unalakleet River by sport fisheries has ranged from about 3.0% in 1996 to about 7.6% in 2002 with an overall average of 4.2% between 1996 and 2002 (Table 4).

Sport fishing effort in the Shaktoolik River is very light, and data are not available.

Sport fishery management actions are usually not taken inseason unless it appears that escapement goals will not be met and an action to reduce subsistence harvest is contemplated.

Most management actions to date have focused on coho salmon. Only one emergency order to reduce sport fish harvest of chinook has been written. In 2003, the Unalakleet and Shaktoolik rivers were closed to the retention of chinook and chum salmon from July 3 through August 15.

### **STOCK OF CONCERN RECOMMENDATION**

Based on the definitions provided in the sustainable salmon policy of 5 AAC 39.222(f) (42), the department considers the Shaktoolik and Unalakleet Subdistricts chinook salmon stock as a candidate for stock of concern status. Specifically, the department assesses the level of concern for the Shaktoolik and Unalakleet Subdistricts chinook salmon stock as a yield concern. Escapement goals have usually been met, but managers have increased restrictions on fishing to do so. These restrictions resulted in an average commercial harvest of 695 fish per year for the five-year period 1999-2003, which is 90% below the previous 10-year harvest (1989-1998) of 7,131 fish and no directed commercial chinook salmon harvest was allowed in 2002 and 2003. Therefore, there has been a chronic inability to maintain near average yields despite specific management actions taken annually.

#### ***Outlook***

The 2004 chinook salmon run in Norton Sound Subdistricts 5 and 6 should be similar to runs in recent years when no commercial fishing was allowed. However, if the chinook salmon run is stronger than expected and escapement is projected to be met, commercial fishing will be allowed. Information from Bering Sea studies (BASIS) and trawl bycatch information indicate a higher abundance of all salmon species than last year. Depending on the origin of these salmon, the 2004 run may be larger than anticipated.

#### ***Alaska Board of Fisheries Action***

In response to the guidelines established in the Sustainable Salmon Fisheries Policy, the Alaska Board of Fisheries, during the January 12-19, 2004 regulatory meeting, is anticipated to classify the Norton Sound Subdistricts 5 and 6 chinook salmon stock as a yield concern.

### **ESCAPEMENT GOAL EVALUATION**

The department has undertaken a review of escapement goals for several Norton Sound salmon stocks where long-term escapement, catch, and age composition data exist that enable the development of biological escapement goals (BEG) or sustainable escapement goals (SEG) based on analysis of production consistent with the escapement goal policy. Chum salmon escapement goals developed in 2000 (Clark 2001a, 2001b) were reviewed and updated for this Board cycle. Additionally, all Norton Sound chinook salmon goals were reviewed in 2003 and additional information was considered in the development of additional goals. A separate report details the escapement goal review for the AYK Region (ADF&G 2004).



In 1999 the department established chinook salmon aerial survey escapement goals for the Shaktoolik, Unalakleet/Old Women and North rivers. An escapement goal for the North River Tower was also established in 1999. It is difficult to obtain aerial survey counts for chinook salmon from the Shaktoolik, Unalakleet/Old Women and North Rivers because of weather and river conditions. A tagging study completed by the Division of Sport Fish in 1999 showed the North River tower chinook salmon count represents about 40% of the chinook salmon escapement to the Unalakleet River Drainage (Table 3; Wuttig 1999). The department recommends discontinuing the use of the aerial escapement goals for the Shaktoolik, Unalakleet/Old Women and North Rivers in favor of using information from the Unalakleet test net and the North River tower. Utilizing additional data since the escapement goal for the North River was established resulted in the department recommending a range of 1,200 to 2,600 chinook salmon (ADF&G 2004).

*List of Current Goals and Proposed SEGs for Subdistricts 5 and 6 Chinook Salmon Stock.*

| Stream                 | Escapement Target | Year Adopted | Target Type | BEG Team Recommendation | Recommended Goal  |
|------------------------|-------------------|--------------|-------------|-------------------------|-------------------|
| Shaktoolik R           | 400-800           | 1999         | EG          | Discontinue             | SEG 1,200 - 2,600 |
| Unalakleet/Old Women R | 550-1,100         | 1999         | EG          | Discontinue             |                   |
| North River (aerial)   | 250-500           | 1999         | EG          | Discontinue             |                   |
| North River (Tower)    | 1,200-2,400       | 1999         | EG          | Establish               |                   |

**MANAGEMENT ACTION PLAN OPTIONS FOR ADDRESSING STOCKS OF CONCERN AS OUTLINED IN THE SUSTAINABLE FISHERIES POLICY**

*Norton Sound Subdistricts 5 and 6 Chinook Salmon Management Plan Review/Development*

**Current Stock Status**

In response to the guidelines established in the Sustainable Salmon Fisheries Policy (5 AAC 39.222), the department recommended the designation of the Subdistricts 5 and 6 chinook salmon stock as a yield concern at the October 2003 Board work session. The Board of Fisheries, after reviewing stock status information and public input during the January 2004 regulatory meeting, is anticipated to classify the Subdistricts 5 and 6 chinook salmon stock as a yield concern. This determination is based on the inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock's escapement needs for the last five years.

**C&T Use Finding and the Amount Necessary**

The Board of Fisheries has made a positive finding for Customary and Traditional Use to be 96,000 to 160,000 for all salmon in the Norton Sound-Port Clarence Districts. Because subsistence fishing restrictions targeting the chinook salmon stocks has only occurred once (2003) in the last five years in Subdistricts 5 and 6 and the Department is not anticipating the



need for restrictions, it is believed amount necessary for subsistence (ANS) findings specific to chinook salmon is not necessary at this time.

### *Habitat Factors Adversely Affecting the Stock*

Annual spring flooding causes ice to scours many rivers sections with in the Shaktoolik and Unalakleet Rivers. There has been fish habitat damage in the Unalakleet drainage due to road construction. An access road has blocked complete estuarine exchange within the lower Unalakleet River Estuary; although fish passage is maintained through other channels. Historically this area has not been mined as in the northern Norton Sound and in particular the Nome Area. The upper Unalakleet River is designated as a Wild and Scenic River and the habitat remains pristine.

### *Do New Or Expanding Fisheries On This Stock Exist?*

There are no new or expanding fisheries on this stock. However, Norton Sound bound chinook salmon may be caught as bycatch in the Bering Sea groundfish fishery.

### *Existing Management Plan*

5 AAC 01.160 FISHING SEASONS AND PERIODS. (b) In the Norton Sound District, fish may be taken at any time except as follows:

(3) in the Unalakleet River from June 1 through July 15, salmon may be taken only from 8:00 a.m. Monday until 8:00 p.m. Saturday.

5 AAC 01.170 LAWFUL GEAR AND GEAR SPECIFICATIONS. (g) In the Unalakleet River from June 1- July 15, no person may operate more than 25 fathoms of gillnet in the aggregate and no person may operate an unanchored fishing net.

## **ACTION PLAN DEVELOPMENT**

### *Norton Sound Subdistricts 5 and 6 Chinook Salmon Action Plan Goal*

Reduce fishing mortality in order to meet spawning escapement goals, to provide reasonable opportunity for subsistence fishing, and to reestablish historic range of harvest levels by other users.

## **ACTION PLAN ALTERNATIVES**

**Action 1.** Provide subsistence salmon gillnet mesh size specifications in Subdistricts 5 and 6, and use of gear types other than gillnets to allow harvest of other species when it is necessary to conserve chinook salmon.

## **Objective**

The objective of this recommended action is to allow subsistence fishers the opportunity to target other species of salmon when it is necessary to conserve chinook salmon.

## **Specific action recommended to implement the objective**

Provide the department emergency order authority to restrict subsistence salmon gillnets to 6 inch or smaller mesh size and to 4 and one-half inch or smaller mesh size when there is an inadequate surplus of chinook salmon. In addition, provide emergency order authority to close fishing with gillnets, but allow use of other gear types (such as beach seines). This would allow the department to target other species such as chum and pink salmon, while conserving chinook salmon.

### **5 AAC 01.170. LAWFUL GEAR AND GEAR SPECIFICATIONS. (i)**

- (1) the pink salmon fishing season in Subdistricts ~~1-3~~ 1-6 and immediately reopen the season in these subdistricts, during which gillnets must have a mesh size of four and one-half inches or less;
- (2) the fishing season in Subdistricts ~~2-and-3~~ 2-6 and immediately reopen the season in those subdistricts to subsistence fishing with any gear that is lawful under 5 AAC 01.170, except gillnets.

### **5 AAC 01.160. FISHING SEASONS AND PERIODS. (b)**

(6) in Subdistricts 5 and 6, salmon other than king salmon may be taken by beach seine during periods established by emergency order.

### **5 AAC 01.170. LAWFUL GEAR AND GEAR SPECIFICATIONS. (j) Notwithstanding (a) –**

(i) of this section, during times when the commissioner determines it to be necessary for the conservation of king salmon, the commissioner, by emergency order may close the fishing season in Subdistricts 5 and 6 and immediately reopen the season in these subdistricts, during which gillnets:

- (1) must be 6 inch or less mesh;
- (2) may not exceed the length specified by the commissioner in the emergency order.

## **Subsistence issues/considerations**

The recommended action is consistent with state subsistence law requirements.

## **Cost/Benefit Analysis**

There would be a cost to subsistence fishers if they need to purchase another gillnet of the required mesh size or a beach seine. The benefit is that subsistence fishers would be able to harvest other abundant salmon species during times of inadequate chinook salmon surplus.

## **Performance measures**

Projects are set in place to monitor escapement inseason.

**Action 2.** When a very low chinook salmon run is identified, determine when commercial and sport fisheries are closed or restricted in relation to one another.

**Objective**

The objective of this action is to provide the department guidance in management actions taken in regard to the commercial fishery and the sport fishery during poor runs. The general public, sport fishers, and sport fishing guides would benefit if there was a policy or regulation that addressed what conservation actions would occur in the sport fishery based on conservation actions taken in the commercial fishery.

**Specific action recommended to implement the objective**

When commercial fishing is closed to conserve chinook salmon then sport fishing will be limited (reduce bag limits, catch and release, or closure).

**Subsistence issues/considerations**

The recommended action is consistent with user group priorities.

**Cost/Benefit Analysis**

There would be a cost to sport fish guides and outfitter businesses if sport fishing was closed or restricted for a species sport fishers wanted to target. The benefit would be having more chinook salmon on the spawning grounds during times of poor runs.

**Performance measures**

Projects are set in place to monitor escapement inseason and to obtain commercial, sport and subsistence harvests.

**BOARD OF FISHERIES REGULATORY PROPOSALS ADDRESSING NORTON SOUND SUBDISTRICTS 5 AND 6 CHINOOK SALMON STOCK OF CONCERN**

Change daily bag limits and set seasonal bag limits for chinook salmon - proposal numbers: 127 and 129.

Change fishing hours for guided sport fishing - proposal number: 128.

**RESEARCH PLAN**

*Norton Sound Initiative and AYK Sustainable Salmon Initiative*

The Norton Sound Research and Restoration Initiative (NSR&RI) Steering Committee (SC) has been formed and in association with the NSR&RI Scientific Technical Committee (STC) is identifying and prioritizing research needs in response to the low chum salmon run in 1999. Through this initiative, native organizations, private industry, non-profit organization, state and federal agencies have joined together to form an innovation partnership to cooperatively address salmon research and restoration needs. The Arctic-Yukon-Kuskokwim Sustainable Salmon

Initiative (AYK SSI) was formed after the NSR&RI and is similar in organization, but encompasses the Yukon and Kuskokwim areas in addition to Norton Sound.

### *Research Projects*

The NSR&RI has several projects occurring in Norton Sound. One project surveyed the Shaktoolik, Unalakleet and North Rivers for possible resistance board weirs sites. Two suitable sites were identified on the Unalakleet River (Menard 2001). Further studies are proposed to NSR&RI and AYK SSI that will help evaluate the utility of counts from the Unalakleet River weir site in management.

The department has submitted proposals to radio tag chum and coho salmon to determine their spawning distribution in the Unalakleet River drainage. Previously there was a radio tagging project to document chinook salmon distribution (Wuttig 1999). Data obtained from these telemetry studies and the weir site study will allow the department to submit a proposal for a weir at the best counting location.

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Table 1. Commercial, subsistence and sport chinook salmon harvests for Subdistricts 5 and 6, 1961-2003.\*

| Year                          | Combined Subdistricts 5 & 6 |                    | Subdistrict 5 (Shaktoolik) |                  | Subdistrict 6 (Unalakleet) |                    | Sport Fish Unalakleet River  |              |              |
|-------------------------------|-----------------------------|--------------------|----------------------------|------------------|----------------------------|--------------------|------------------------------|--------------|--------------|
|                               | Commercial                  | Subsistence        | Commercial                 | Subsistence      | Commercial                 | Subsistence        | Year                         | Catch        | Harvest      |
| 1961                          | 5,300                       |                    | 140                        |                  | 5,160                      |                    | 1961                         |              |              |
| 1962                          | 6,827                       |                    | 1,738                      |                  | 5,089                      |                    | 1962                         |              |              |
| 1963                          | 6,421                       |                    | 480                        |                  | 5,941                      |                    | 1963                         |              |              |
| 1964                          | 1,904                       | 585                | 631                        | 77               | 1,273                      | 488                | 1964                         |              |              |
| 1965                          | 1,448                       | 552                | 127                        | 31               | 1,321                      | 521                | 1965                         |              |              |
| 1966                          | 1,518                       | 232                | 310                        | 142              | 1,208                      | 90                 | 1966                         |              |              |
| 1967                          | 1,794                       | 752                | 43                         | 262              | 1,751                      | 490                | 1967                         |              |              |
| 1968                          | 1,021                       | 196                | 61                         | 10               | 960                        | 186                | 1968                         |              |              |
| 1969                          | 2,309                       | 364                | 33                         | 40               | 2,276                      | 324                | 1969                         |              |              |
| 1970                          | 1,801                       | 538                | 197                        | 43               | 1,604                      | 495                | 1970                         |              |              |
| 1971                          | 2,450                       | 998                | 284                        | 87               | 2,166                      | 911                | 1971                         |              |              |
| 1972                          | 2,654                       | 707                | 419                        | 64               | 2,235                      | 643                | 1972                         |              |              |
| 1973                          | 1,686                       | 374                | 289                        | 51               | 1,397                      | 323                | 1973                         |              |              |
| 1974                          | 2,683                       | 406                | 583                        | 93               | 2,100                      | 313                | 1974                         |              |              |
| 1975                          | 2,289                       | 181                | 651                        | 18               | 1,638                      | 163                | 1975                         |              |              |
| 1976                          | 2,103                       | 166                | 892                        | 24               | 1,211                      | 142                | 1976                         |              |              |
| 1977                          | 4,212                       | 772                | 1,521                      | 49               | 2,691                      | 723                | 1977                         |              |              |
| 1978                          | 8,864                       | 1,125              | 1,339                      | 81               | 7,525                      | 1,044              | 1978                         |              |              |
| 1979                          | 8,731                       | 702                | 2,377                      | 62               | 6,354                      | 640                | 1979                         |              |              |
| 1980                          | 5,425                       | 1,103              | 1,086                      | 57               | 4,339                      | 1,046              | 1980                         |              |              |
| 1981                          | 7,641                       | 877                | 1,484                      | 8                | 6,157                      | 869                | 1981                         |              |              |
| 1982                          | 5,445                       | 981                | 1,677                      | 68               | 3,768                      | 913                | 1982                         |              |              |
| 1983                          | 9,764                       | 1,868              | 2,742                      |                  | 7,022                      | 1,868              | 1983                         |              | 93           |
| 1984                          | 8,417                       | 1,650              | 1,613                      |                  | 6,804                      | 1,650              | 1984                         |              | 39           |
| 1985                          | 17,933                      | 1,695              | 5,312                      | 298              | 12,621                     | 1,397              | 1985                         |              | 179          |
| 1986                          | 5,569                       |                    | 1,075                      |                  | 4,494                      |                    | 1986                         |              | 850          |
| 1987                          | 5,460                       |                    | 2,214                      |                  | 3,246                      |                    | 1987                         |              |              |
| 1988                          | 2,889                       |                    | 671                        |                  | 2,218                      |                    | 1988                         |              |              |
| 1989                          | 5,643                       |                    | 1,241                      |                  | 4,402                      |                    | 1989                         |              | 49           |
| 1990                          | 8,642                       | 2,476              | 2,644                      |                  | 5,998                      | 2,476              | 1990                         | 351          | 276          |
| 1991                          | 5,858                       |                    | 1,324                      |                  | 4,534                      |                    | 1991                         | 375          | 296          |
| 1992                          | 4,507                       |                    | 1,098                      |                  | 3,409                      |                    | 1992                         | 476          | 117          |
| 1993                          | 8,700                       |                    | 2,756                      |                  | 5,944                      |                    | 1993                         | 2,340        | 382          |
| 1994                          | 5,285                       | 6,469              | 885                        | 1,175            | 4,400                      | 5,294              | 1994                         | 517          | 379          |
| 1995                          | 8,856                       | 6,324              | 1,239                      | 1,275            | 7,617                      | 5,049              | 1995                         | 588          | 259          |
| 1996                          | 4,984                       | 6,438              | 1,340                      | 1,114            | 3,644                      | 5,324              | 1996                         | 2,059        | 384          |
| 1997                          | 11,516                      | 7,471              | 2,449                      | 1,146            | 9,067                      | 6,325              | 1997                         | 5,144        | 842          |
| 1998                          | 7,323                       | 4,945              | 910                        | 982              | 6,413                      | 3,963              | 1998                         | 1,539        | 513          |
| 1999                          | 2,508                       | 3,509              | 581                        | 818              | 1,927                      | 2,691              | 1999                         | 669          | 415          |
| 2000                          | 742                         | 2,869              | 160                        | 440              | 582                        | 2,429              | 2000                         | 1,045        | 345          |
| 2001                          | 206                         | 4,598              | 90                         | 936              | 116                        | 3,662              | 2001                         | 542          | 250          |
| 2002                          | 5                           | 3,597              | 1                          | 1230             | 4                          | 2,367              | 2002                         | 835          | 544          |
| 2003                          | 12                          | <sup>b</sup>       | 2                          | <sup>b</sup>     | 10                         | <sup>b</sup>       | 2003                         | <sup>b</sup> | <sup>b</sup> |
| 1999-2003 average             | 695                         | 3,643 <sup>b</sup> | 167                        | 856 <sup>b</sup> | 528                        | 2,787 <sup>b</sup> | Sport Fish 1999-2002 average | 773          | 389          |
| Commercial 1989-1998 average  | 7,131                       |                    | 1,589                      |                  | 5,543                      |                    | Sport Fish 1989-1998 average |              | 350          |
| Subsistence 1994-1998 average |                             | 6,329              |                            | 1,138            |                            | 5,191              | Sport Fish 1994-1998 average | 1,969        | 475          |

\* Subsistence harvest data are incomplete prior to 1979. Subsistence surveys not conducted in all communities between 1986-1993.

<sup>b</sup> 2003 data not yet available, average is: 1999-2002.

Table 2. Subdistricts 5 and 6 Management Actions

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|      |   |
|------|---|
| 1993 | -Commercial drift fishing allowed in June so fishers can avoid fouling their nets with the debris loads in the spring. Chum fishing closed early because of weak run.   |
| 1994 | -Chinook salmon periods limited to two 24-hour periods per week. Pink salmon fishing opened continuously. There was no fisher interest in chum salmon. A strong coho salmon run results in record harvest.  |
| 1995 | -Strong chinook salmon run. Buyer expresses interest in pink salmon and limited interest in chum salmon. Late season coho salmon closure (August 26) to bolster escapement.   |
| 1996 | -Early run of chinook salmon. Limited market for chum salmon. Pink salmon fishing opened continuously. Strong run of coho salmon.   |
| 1997 | -The last year the majority of the chinook periods are two 48-hour periods per week. Best chinook commercial harvest of the decade. Limited market for chum salmon. Coho run is below average and season closes on August 23.   |
| 1998 | -The majority of chinook periods are now 24 hours in length. Limited market for chum salmon. Pink salmon fishing opened continuously because of large surplus of pink salmon. Shaktoolik Subdistrict opened to continuous fishing the last two weeks of August to provide flexibility during persistent inclement weather.  |
| 1999 | -Weak runs of chinook, chum and coho salmon. Coho commercial fishing restricted to two 24-hour periods per week instead of the normal two 48-hour periods per week.   |
| 2000 | -Only two commercial chinook fishing periods. Lowest commercial chinook and chum harvest to date. Pink salmon fishing opened continuously to allow buyer to more effectively direct fleet. Pink catches were below average which was attributed to low volumes of fish and lack of fishing interest.  |
| 2001 | -Only two commercial chinook fishing periods. Lowest commercial chinook and chum harvest to date.   |
| 2002 | -No commercial chinook or chum fishing because of weak runs. No market interest in pink salmon unless there is a 500,000 pink salmon harvest projection.<br>-Coho commercial fishing time reduced to two 24 hour periods per week. Commercial coho fishing closed on August 19 to protect coho salmon. Sport fish reduces bag limit to one per day from five per day. |
| 2003 | -No commercial chinook or chum fishing because of weak runs.<br>-Three week (July 3-25) subsistence salmon fishing closure to protect chinook and chum in Shaktoolik and Unalakleet River drainages. Subsistence beach seining for pink salmon is allowed.  |

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| Table 3. North River Tower Chinook Salmon count expanded to the Unalakleet Drainage.                                    |                             |  |                                 |  |  |
|---|-----------------------------|--|---------------------------------|--|--|
| Year  | Operating Period            |  | North River Tower Chinook Count |  | Estimated Unalakleet River Drainage Chinook Count <sup>a</sup> |
| 1984  | June 25-July 28             |  | 2,844                           |  | 7,110  |
| 1985  | June 27-Aug 31              |  | 1,426                           |  | 3,565  |
| 1986  | June 25-July 18             |  | 1,613                           |  | 4,033  |
| 1996  | June 16-July 25             |  | 1,197                           |  | 2,993  |
| 1997  | June 16-Aug 21              |  | 4,185                           |  | 10,463   |
| 1998  | June 15-Aug 12              |  | 2,100                           |  | 5,250  |
| 1999  | June 30-Aug 31              |  | 2,263                           |  | 5,658  |
| 2000  | June 17-Aug 12              |  | 1,046                           |  | 2,615  |
| 2001  | July 5-Sept 15 <sup>b</sup> |  | 1,337                           |  | 3,343  |
| 2002  | June-19-Aug 30              |  | 1,505                           |  | 3,763  |
| 2003  | June 15-Sept 13             |  | 1,452                           |  | 3,630  |
|   |                             |  |                                 |  |  |
| <sup>a</sup> North River Tower chinook count represents 40% of the Unalakleet drainage chinook escapement (Wuttig 1999) |                             |  |                                 |  |  |
| <sup>b</sup> Minimum count due to late start of project   |                             |  |                                 |  |  |

Table 4. Exploitation of Unalakleet River drainage chinook salmon.

| Year      | North River Count | Estimated Total Unk Escapement <sup>a</sup> | Estimated total run (Esc+Harvest) | Proportion exploited Commercial | Proportion exploited Subsistence | Proportion exploited Sport | Total exploitation com+sub | Total exploitation com+sub+sp |
|-----------|-------------------|---|-----------------------------------|---------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------|
| 1996      | 1,197             | 2,993                                       | 12,730                            | 0.286                           | 0.418                            | 0.030                      | 0.705                      | 0.735                         |
| 1997      | 4,185             | 10,463                                      | 27,539                            | 0.329                           | 0.230                            | 0.031                      | 0.559                      | 0.590                         |
| 1998      | 2,100             | 5,250                                       | 16,652                            | 0.385                           | 0.238                            | 0.031                      | 0.623                      | 0.654                         |
| 1999      | 2,263             | 5,658                                       | 11,106                            | 0.174                           | 0.242                            | 0.037                      | 0.416                      | 0.453                         |
| 2000      | 1,046             | 2,615                                       | 6,316                             | 0.092                           | 0.385                            | 0.055                      | 0.477                      | 0.531                         |
| 2001      | 1,337             | 3,343                                       | 6,769                             | 0.017                           | 0.415                            | 0.037                      | 0.432                      | 0.469                         |
| 2002      | 1,505             | 3,763                                       | 7,243                             | 0.001                           | 0.330                            | 0.076                      | 0.331                      | 0.407                         |
| 2003      | 1,452             | 3,630                                       |                                   |                                 |                                  |                            |                            |                               |
| Avg 97-01 | 2,186             | 5,466                                       | 13,676                            | 0.199                           | 0.302                            | 0.038                      | 0.501                      | 0.539                         |
| Avg 00-02 | 1,296             | 3,240                                       | 6,775                             | 0.037                           | 0.377                            | 0.056                      | 0.413                      | 0.469                         |

<sup>a</sup> Escapement estimated based on data from Wuttig 1999.

Figure 1. Norton Sound commercial salmon fishing districts and subdistricts.

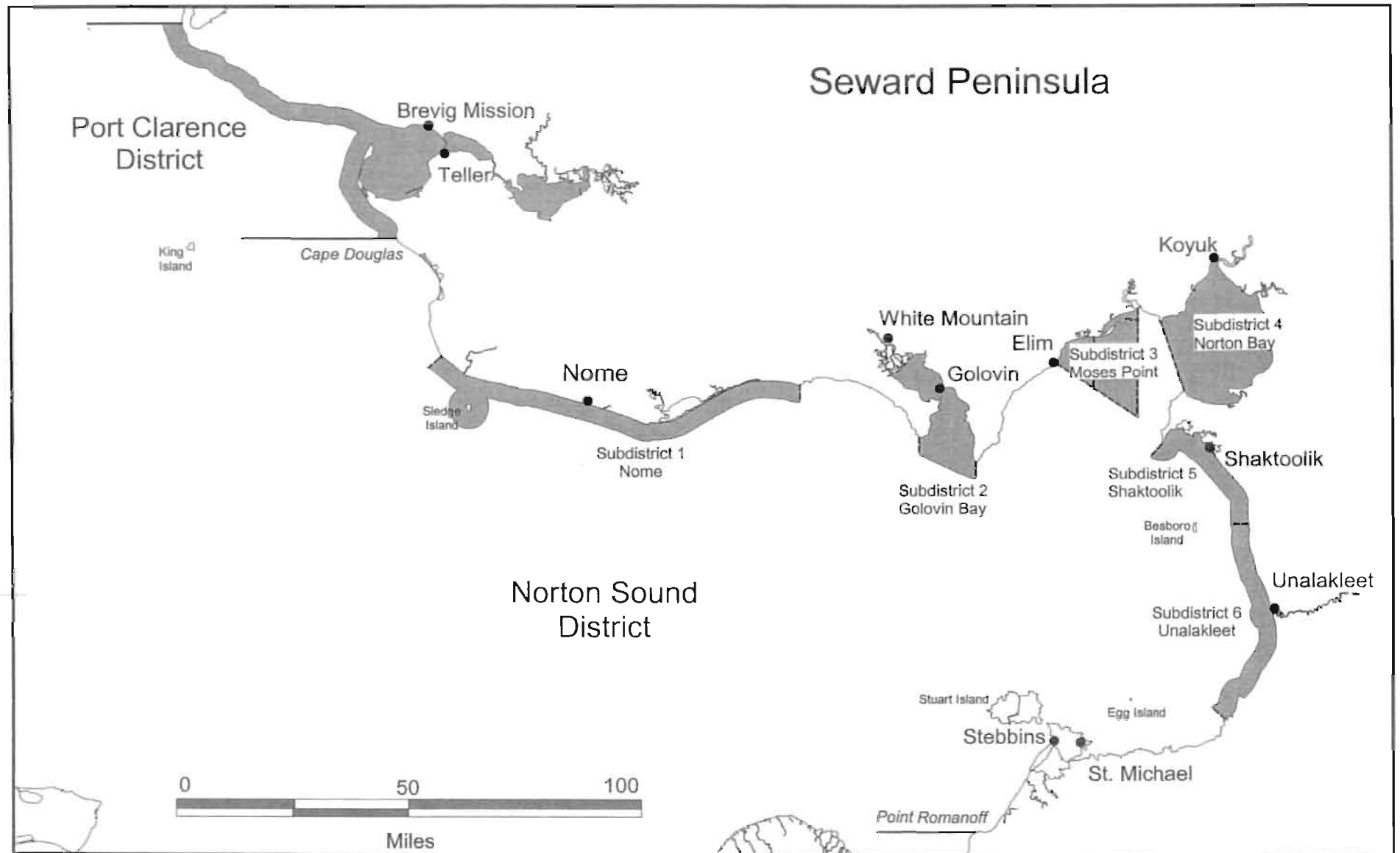


Figure 2. Map of Salmon Rivers in Norton Sound

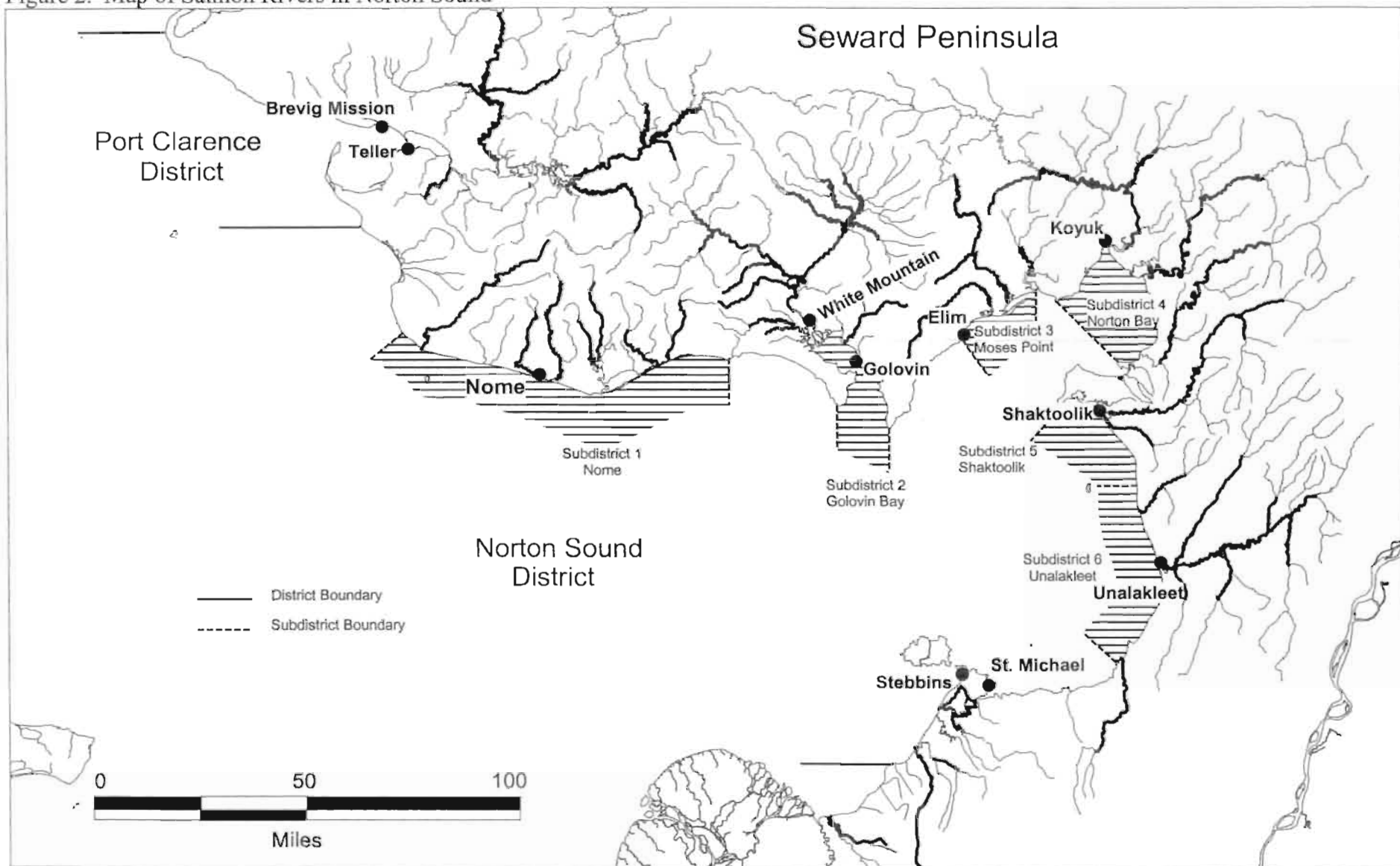


Figure 3. Unalakleet Test Net Chinook Salmon Catch.

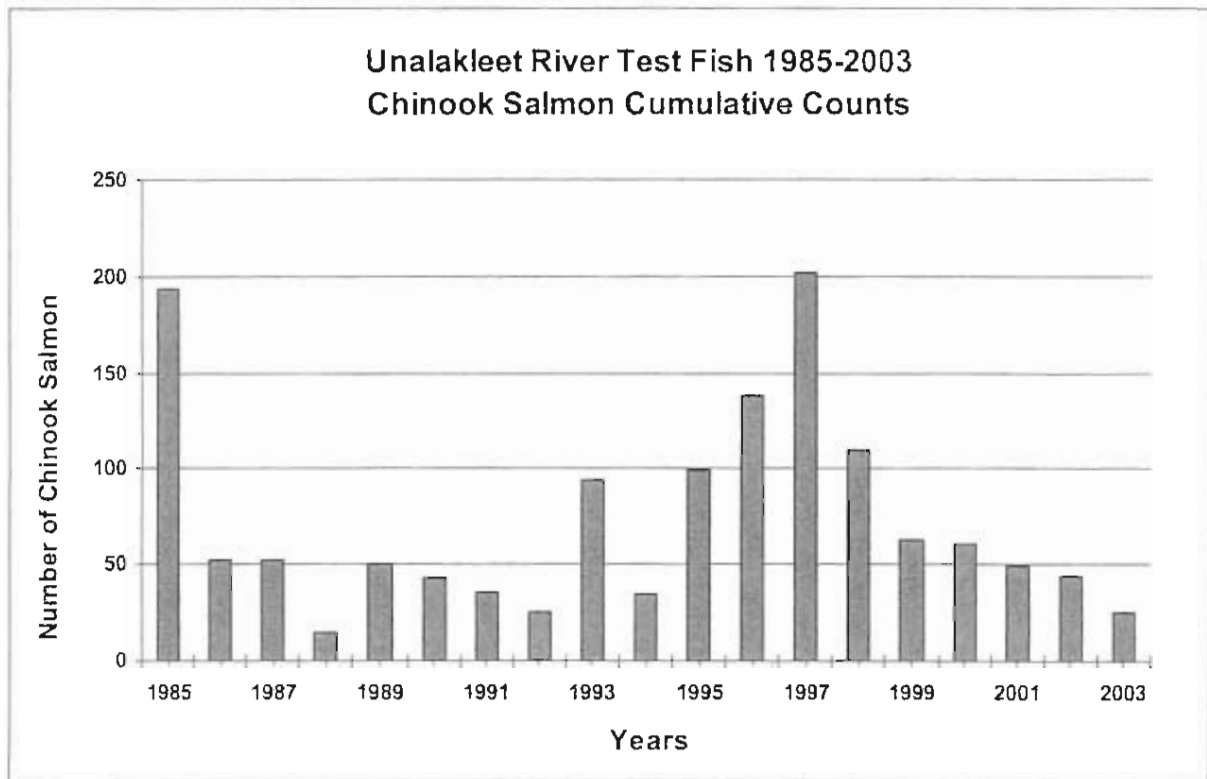


Figure 4. North River Chinook Salmon Escapement.

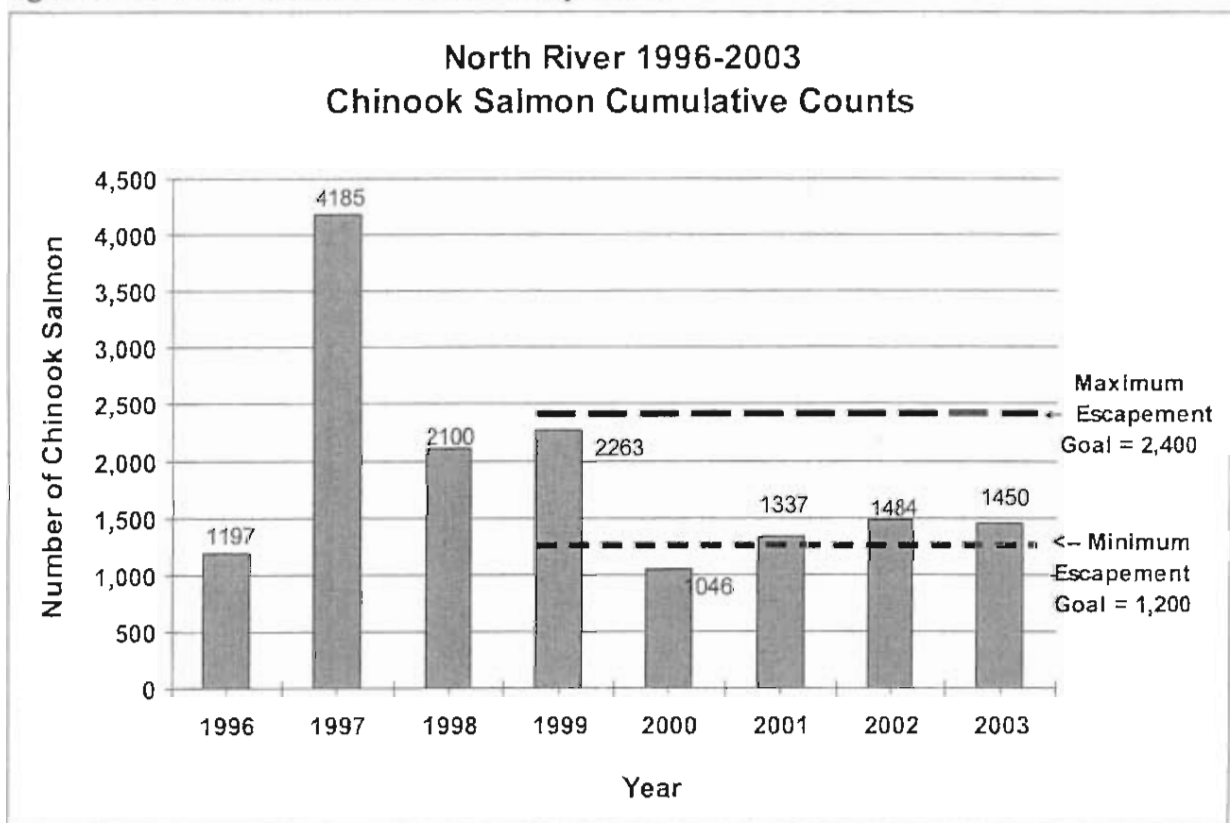
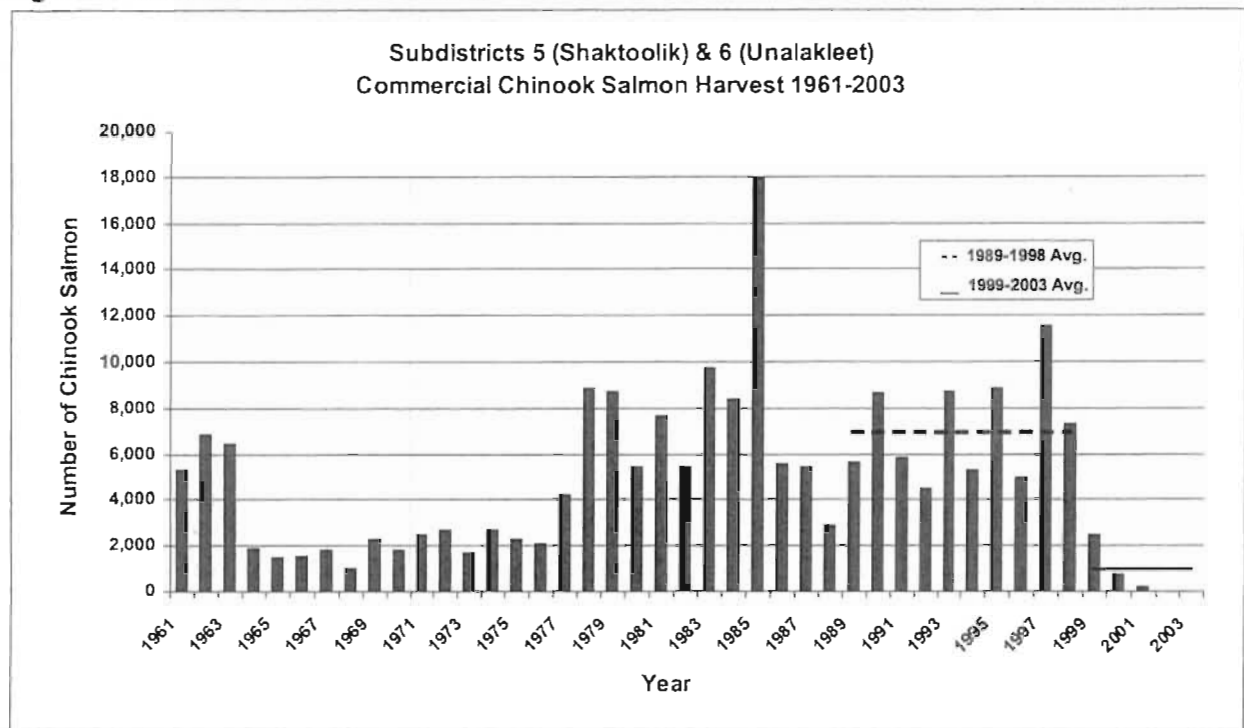
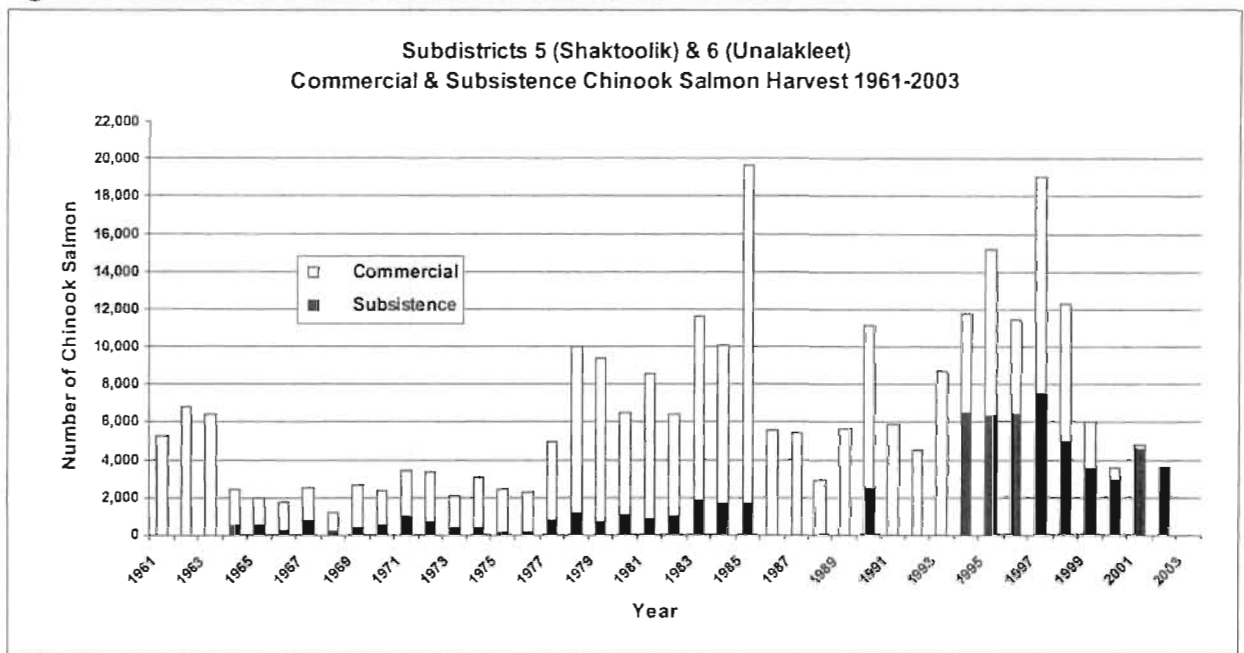


Figure 5. Subdistricts 5 and 6 Commercial Chinook Salmon Harvest<sup>a</sup>.



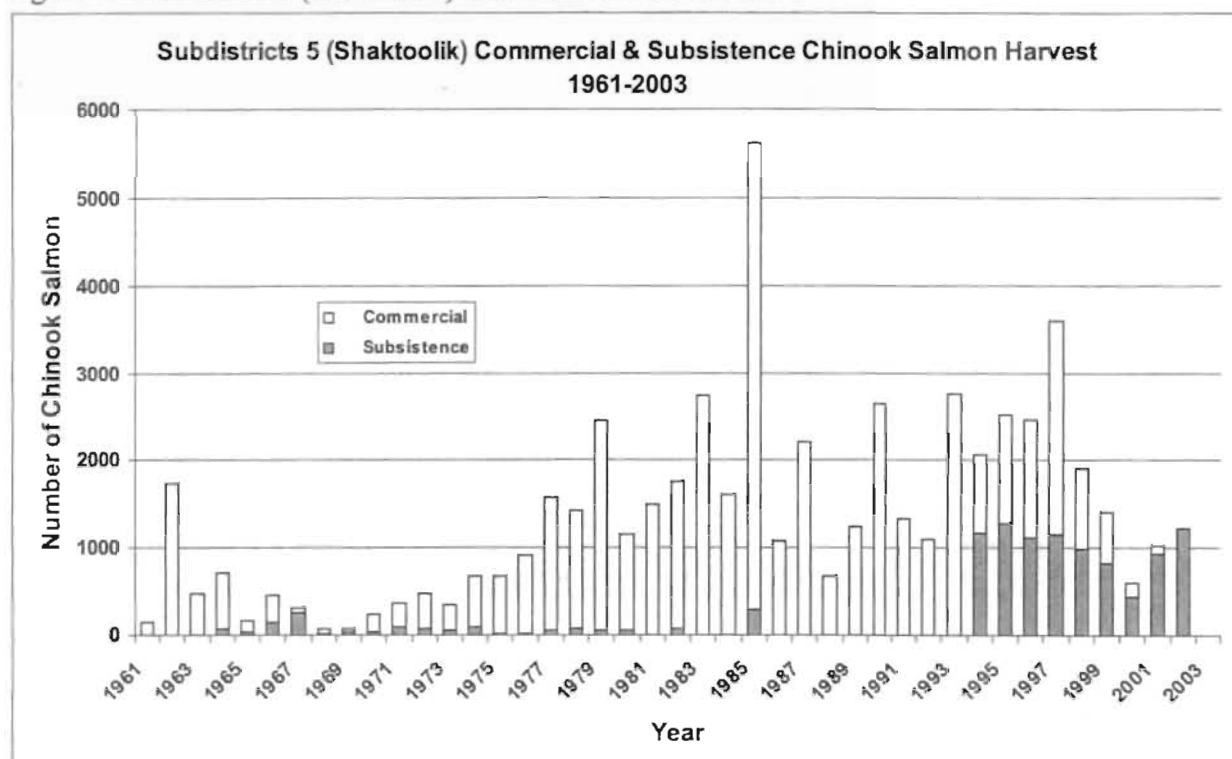
<sup>a</sup> Subsistence data not available for all years, 2003 Subsistence data not yet available.

Figure 6. Subdistricts 5 and 6 Combined Chinook Salmon Harvest<sup>a</sup>.



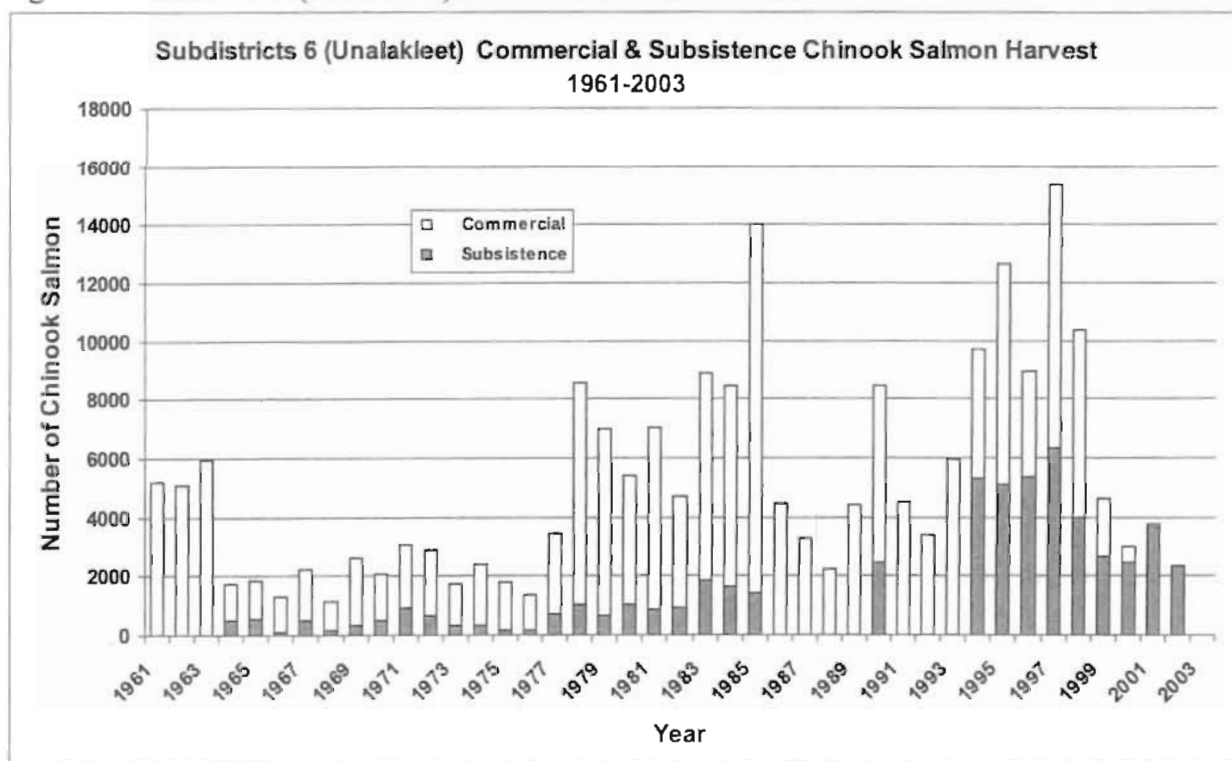
<sup>a</sup> Subsistence data not available for all years, 2003 Subsistence data not yet available.

Figure 7. Subdistrict 5 (Shaktoolik) Chinook Salmon Harvest<sup>a</sup>.



<sup>a</sup> Subsistence data not available for all years, 2003 Subsistence data not yet available.

Figure 8. Subdistrict 6 (Unalakleet) Chinook Salmon Harvest<sup>a</sup>.



<sup>a</sup> Subsistence data not available for all years, 2003 Subsistence data not yet available.